

Response to 03-22-2011 Non-Final Office Action
Serial No. 10/566,334
Docket No. 044186.032402

AMENDMENTS TO THE DRAWINGS

Please replace sheet 1 of 3 with the replacement sheet submitted herewith.

This amendment merely adds “PRIOR ART” to Figures 2 and 3.

REMARKS

Introduction

Claims 1, 3, 8-10, 12, 16-18, 21-23, 25-29, 33-35, 37, 38, 40-42, 45-58 are pending. Claims 2, 4-7, 11, 13, 19, 20, 24, 30-32, 36, 39, 43, and 44 were previously cancelled and claims 14 and 15 have been cancelled herein. Claims 1, 16-18, 27-29, and 47 have been amended and claims 50-58 have been newly added herein.

Amendments to the Claims

The amendments to claim 1 are supported by the original disclosure at, for example, paragraphs 0015, 0071, 0082, 0088, and 0089, and Figure 5.

The amendments to claims 16, 17, and 18 are supported by the original disclosure at, for example, their respective original claims.

The amendments to claim 27 are supported by the original disclosure at, for example, paragraph 0062.

The amendments to claim 28 are supported by the original disclosure at, for example, paragraph 0061.

The amendments to claim 29 are supported by the original disclosure at, for example, paragraphs 0061, 0071, 0082, and 0088.

The amendments to claim 47 are supported by the original disclosure at, for example, paragraph 0015.

New claims 50 and 51 are supported by the original disclosure at, for example, paragraphs 0084 and 0089.

New claim 52 is supported by the original disclosure at, for example, paragraphs 0084 and 0095.

New claim 53 is supported by the original disclosure at, for example, paragraphs 0084 and 0086.

New claims 54 and 55 are supported by the original disclosure at, for example, paragraph 0086.

New claim 56 is supported by the original disclosure at, for example, paragraph 0088.

New claim 57 is supported by the original disclosure at, for example, paragraph 0015.

New claim 58 is supported by the original disclosure at, for example, paragraph 0088.

Objection to the Disclosure

The disclosure is objected to because Figures 2 and 3 should be labeled as prior art and because paragraph 0033 is unclear whether its reference to “FIGS. 2-5” pertains to WO 02/086987 or the present application. It is respectfully submitted that these objections have been overcome by the amendments to the drawings and the specification herein. Specifically, Figures 2 and 3 have been labeled “PRIOR ART” and paragraph 0033 has been amended to clarify that “FIGS. 2-5” refers to FIGS. 2-5 of WO 02/086987. Accordingly, withdrawal of the objections to the disclosure is respectfully requested.

Objection to the Drawings

The drawings are objected to because Figures 2 and 3 should be labeled as prior art. Figures 2 and 3 have been labeled “PRIOR ART.” Accordingly, withdrawal of the objection to the drawings is respectfully requested.

Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 1, 3, 8-10, 12, 15-18, 21-23, 25-28, and 47-49 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Applicants appreciate the Examiner’s suggested amendment for overcoming these rejections and have attempted to implement its concept in connection with additional amendments responsive to the art-based rejections discussed below.

As amended herein, claim 1 recites “forming said hydrogen separation membrane upon said surface of the substrate by performing a plurality of deposition cycles, each deposition cycle comprising *disposing* upon said surface a composition, *forming a coating* on said surface of the substrate by a laser direct-write process utilizing said composition, subjecting the coating to *soft baking*, and subjecting the coating to *sintering*.” This process is supported by the original disclosure at, for example, Figure 5 (disposing, forming, and subjecting operations) and

paragraph 0089 (cycles comprising “coating-soft baking-sintering”). Accordingly, withdrawal of the rejections under 35 U.S.C. § 112, first paragraph, is respectfully requested.

Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1, 3, 8-10, 12, 14-18, 21-23, 25-28, and 47-49 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. Applicants submit that the amendments to claim 1 eliminate any ambiguity with respect to the timing of the claimed thermal processing (now more specifically recited as “soft baking” and “sintering” operations). Further, claim 14 and several other claims have been cancelled to remove any potential conflicts with amended claim 1. Withdrawal of the rejections under 35 U.S.C. § 112, second paragraph, is respectfully requested.

Rejections Under 35 U.S.C. § 103

Claims 1, 3, 8-10, 12, 14-18, 21-23, 25-31, 33-35, 37, 40-42, 45-49 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,152,987 to Ma et al. in view of U.S. Patent Application Publication No. 2001/0016236 to Hu and further in view of U.S. Patent No. 6,214,090 to Dye et al. or U.S. Patent No. 5,738,708 to Peachey et al., optionally combined with European Patent Application No. EP 1208904 to Yoshida et al.

Claim 1 has been amended to more particularly define the thermal processing. Specifically, claim 1 now recites “forming said hydrogen separation membrane upon said surface of the substrate by performing a plurality of deposition cycles, each deposition cycle comprising disposing upon said surface a composition, forming a coating on said surface of the substrate by a laser direct-write process utilizing said composition, subjecting the coating to *soft baking*, and subjecting the coating to *sintering*” where “the soft baking substantially removes the carrier component from the coating” and “the sintering substantially densifies and mends the metallic component of the coating to provide substantially complete coverage of the surface without substantial openings or defects in the coating.” It is respectfully submitted that the cited

combination of references does not teach or suggest these operations and/or these results as claimed in combination with the other elements of claim 1.

Claim 29 has been amended to more particularly define structure produced by the thermal processing. Specifically, claim 29 now recites “the thermal processing comprises soft baking, the soft baking rendering the coating substantially free of the carrier component, and sintering, the sintering rendering the metallic component densified and mended to provide substantially complete coverage of the surface without substantial openings or defects in the coating.” It is respectfully submitted that the cited combination of references does not teach or suggest a structure embodying these features as claimed in combination with the other elements of claim 29.

The Office action asserts that Hu discloses the thermal processing elements previously included in claims 1 and 29. Hu, however, does not appear to disclose at least the currently claimed thermal processing comprising sintering that “densifies and mends the metallic component of the coating to provide substantially complete coverage of the surface without substantial openings or defects in the coating” as claimed.¹ Instead, Hu appears to mention application of heat in the context coating formation for the purpose of evaporating a liquid component of a suspension.²

Further, Hu distinguishes and teaches away from coating formation processes that employ high-temperature thermal processing: “The methods of the present invention offer numerous advantages over other technologies . . . for the production of metallic particles, films, and other materials such as alloys and composites. . . . The methods are energy-efficient and have ***no requirement for high temperature or pressure/vacuum systems***, such as are required for other technologies.”³ As the Supreme Court stated in *KSR*, “when the prior art teaches away

¹ Hu uses the word “sintering,” but not in the context of densifying and mending a coating to provide coverage of the surface without openings or defects as claimed. See Hu paragraph 0026 (“*removal of the biological components from the films, e.g., by sintering*”) and paragraph 0035 (“*metals coating on solid particles that are partially sintered onto inorganic membranes*”).

² Hu paragraphs 0006, 0025, and 0026.

³ Hu paragraph 0009.

from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious.”⁴

For at least these reasons, it is respectfully submitted that independent claims 1 and 29 are patentable over the cited combination of references. Claims 3, 8-10, 12, 16-18, 21-23, 25-28, 47, 48, and 50-56 depend from claim 1 and are believed to be patentable over the cited combination of references for at least the same reason. Claims 33-35, 37, 38, 40-42, 45, 46, 49, 57, and 58 depend from claim 29 and are believed to be patentable over the cited combination of references for at least the same reason.

In addition, Applicants respectfully maintain their assertions that the cited combination of references does not teach or suggest the claimed polishing step or the claimed laser direct-write process as discussed in the Corrected Amendment and Response to Final Office Action filed February 5, 2011, which is incorporated by reference.

Double Patenting Rejections

Claims 29, 33-35, 37, 38, 40-42, 45, 46, and 49 are rejected on the ground of nonstatutory obviousness-type double patenting as being allegedly unpatentable over claims 1-15 of U.S. Patent No. 7,560,170 to Chellappa in view of Ma and optionally further in view of Hu. It is respectfully submitted that claim 29, as amended herein, and its dependent claims are not obvious in view of claims 1-15 of the '170 patent at least due to the more particularly claimed thermal processing operations.

Claims 1, 3, 8-10, 12, 14-18, 21-23, 25-29, 33-35, 37, 38, 40-42, and 45-49 are rejected on the ground of nonstatutory obviousness-type double patenting as being allegedly unpatentable over claims 1-27 of U.S. Patent No. 7,077,889 to Chellappa et al. in view of Ma and further in view of Hu. It is respectfully submitted that claims 1 and 29, as amended herein, and their dependent claims are not obvious in view of claims 1-27 of the '889 patent at least due to the more particularly claimed thermal processing operations.

⁴ *KSR Intern. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740 (2007).

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Accordingly, reconsideration and withdrawal of the double patenting rejections is respectfully requested. Otherwise, Applicants are willing to consider filing appropriate terminal disclaimers if required to advance prosecution to allowance after all other issues are resolved.

Conclusion

In light of the foregoing, it is respectfully submitted that the pending claims, as amended, are patentable over the references cited. Reconsideration of the application and withdrawal of the objections and rejections of record are respectfully requested.

The Commissioner is hereby authorized to charge any additional fees that may be required by this paper, or to credit any overpayment to Deposit Account 50-2036.

If the Examiner wishes to discuss any aspect of this response, please contact the undersigned at the telephone number provided below.

Respectfully submitted,

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